

ABSTRACT

A microelectromechanical (MEM) optical switching apparatus is disclosed that is based on an erectable mirror which is formed on a rotatable stage using surface micromachining. An electrostatic actuator is also formed on the substrate to rotate the stage and mirror with a high angular precision. The mirror can be erected manually after fabrication of the device and used to redirect an incident light beam at an arbitrary angle and to maintain this state in the absence of any applied electrical power. A $1 \times N$ optical switch can be formed using a single rotatable mirror. In some embodiments of the present invention, a plurality of rotatable mirrors can be configured so that the stages and mirrors rotate in unison when driven by a single micromotor thereby forming a 2×2 optical switch which can be used to switch a pair of incident light beams, or as a building block to form a higher-order optical switch.